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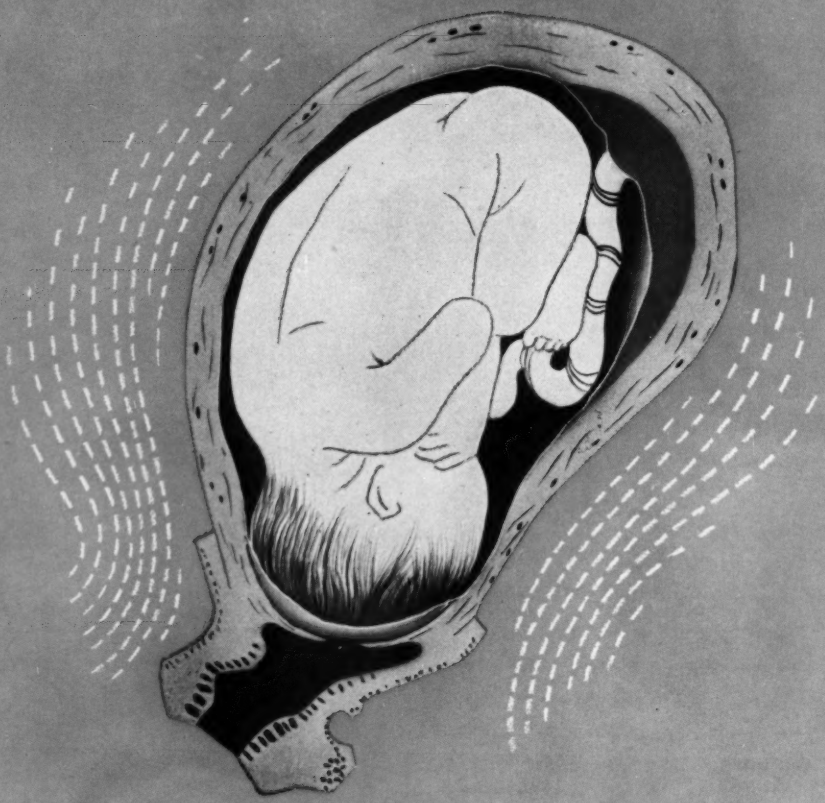

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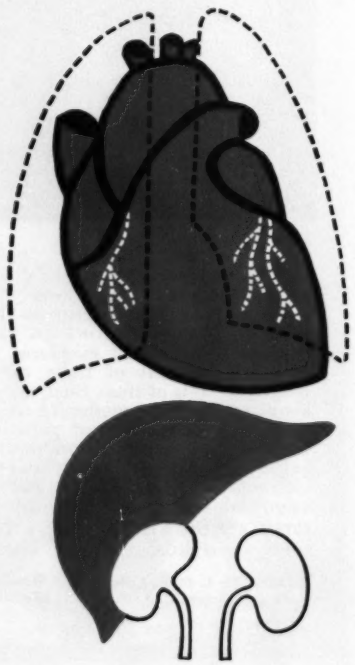

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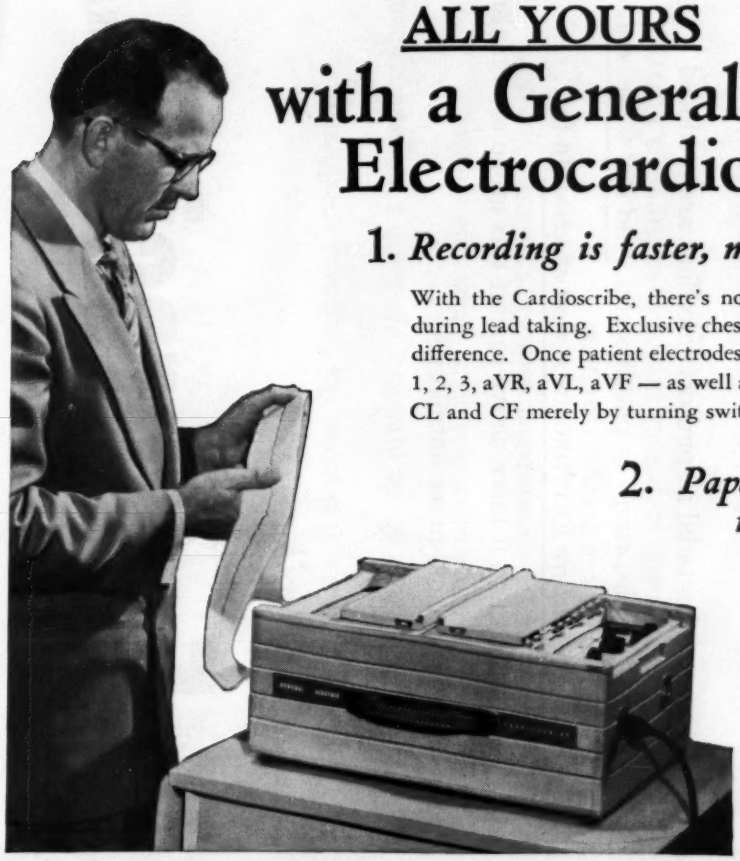

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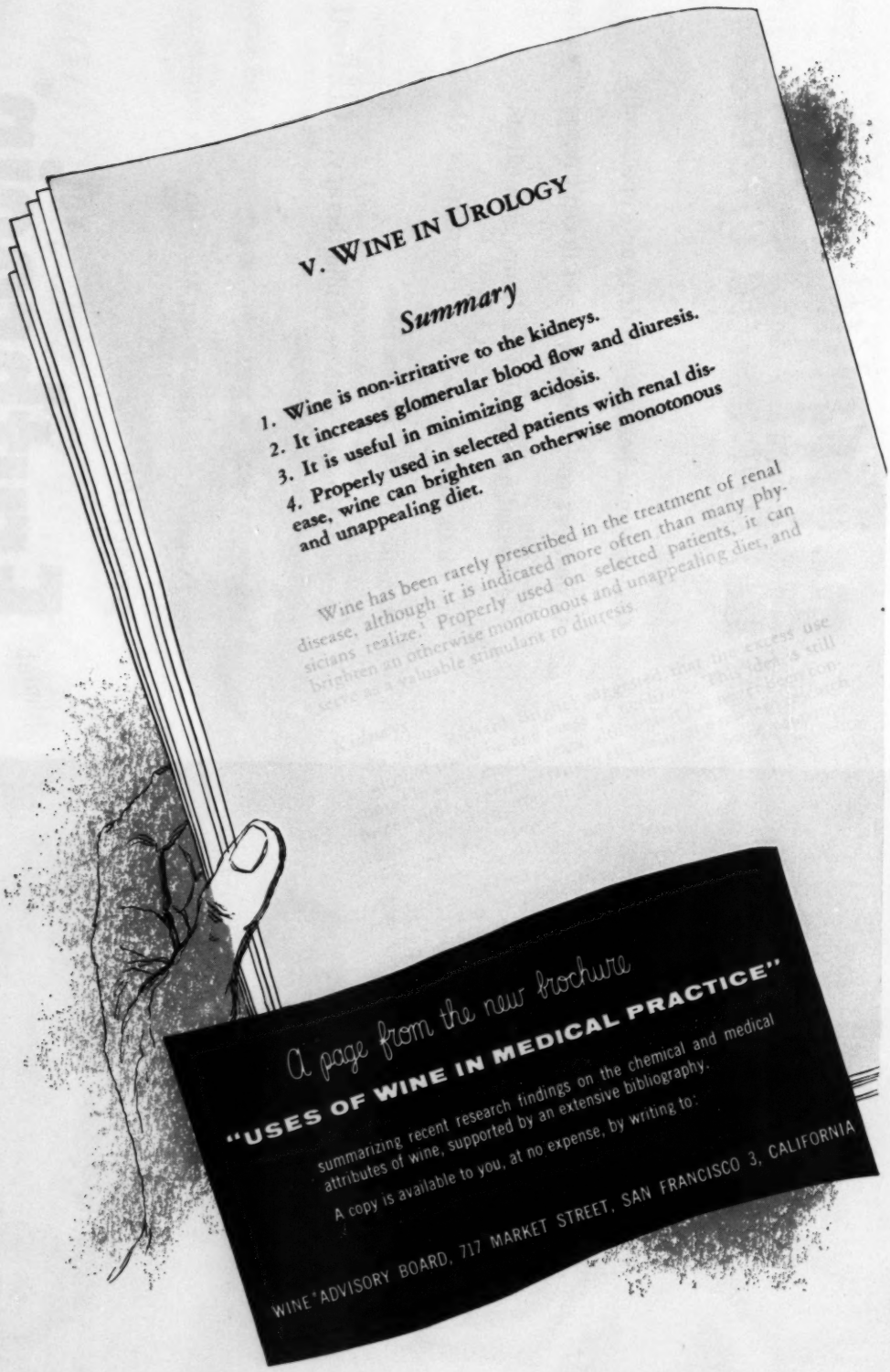
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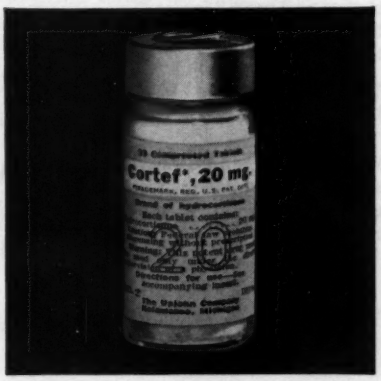

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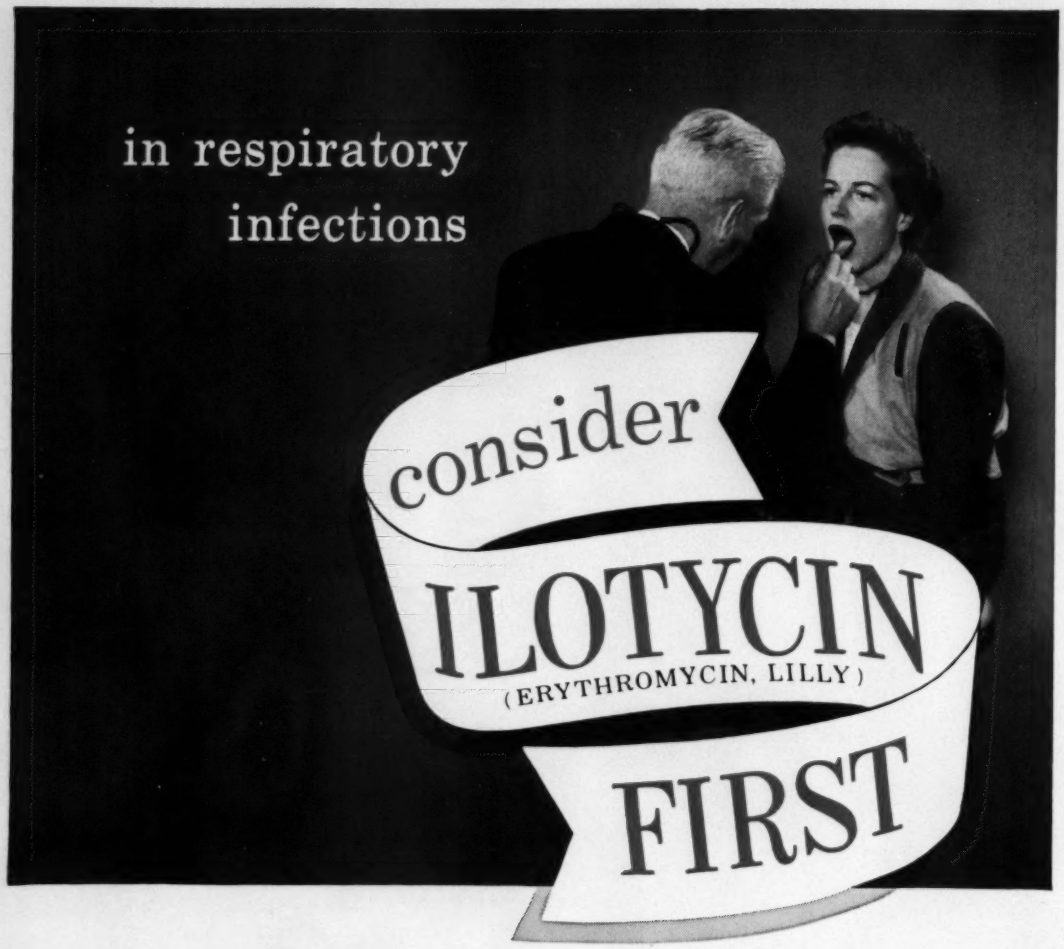

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THE EARLY MANAGEMENT OF POLIOMYELITIS*

WILLIAM T. GREEN, M.D.,**
Boston, Mass.

I want to talk a bit about the early treatment of poliomyelitis and to call attention to some of the highlights of care during that period.

There are really two aspects that we should consider in the disease early: its characteristic of acute illness; and its demands in symptomatic care. Those demands as an acute illness may be quite dramatic. It may extend into the area of bulbar difficulty and respiratory difficulty, so that in its early state, in the isolated cases, there may be a great deal of drama and it requires immediate action, accurate action, if life is to be saved.

But except for that, the greater part of the problem has to do with the musculo-skeletal disease, and I would like to emphasize that by entering into the care of this musculo-skeletal disease early in the prevention of deformities and in rehabilitation, a great deal of the crippling effect can be eased, and certainly the treatment in the future can be simplified.

I will refer later, if I may, to a part of the care during the bulbar and respiratory phases, but I would like to ask first why is polio such a crippling disease? Is it entirely the great lay interest in the disease that has emphasized its importance as a crippling disease, or is it really crippling?

It really is crippling, and in its effect upon the nervous system there are two characteristics that account for this crippling. The first is the fact that we have a flaccid paralysis, and that this flaccid paralysis is likely to be patchy in distribution, and often is asymmetrical in distribution. So that if the agonists are involved controlling a joint, the antagonists may not be involved. So we have one group of muscles that tend to pull and deform.

The second characteristic that makes it crippling is the fact that those muscles that still have their innervation tend to shorten; many of them tend to shorten or show so-called muscle spasm. They have increased electropotentials, they are irritated by stretching, and they want to shorten and stay short if the patient is comfortable and if he is left on his own.

So you have, by its characteristics of muscle disease, a disease which paralyzes one group to a greater or less degree so that it can't control the part, and a good many of the muscles that are left and have innervation tend to deform and pull the part into deformity.

One other thing increases the crippling effect, and that is that if the muscles are left shortened and the part is left in that position, it tends to stay in that position, and if it is left long enough you will have a terrible time getting it out of the deformed attitude.

Without going into detail, this adaptation of the shortened muscle to its new length is given the term myostatic contracture. It is not just a characteristic of polio; it is a characteristic of the neuromuscular mechanism. So the muscles tend to shorten, and if they are left that way they tend to stay that way and the deformity can become a fixed one and can become a permanent one.

In an aside, I would like to add one other feature of the disease, and that is that deformity tends to inhibit the return of the limb power of those muscles which are stretched out of their natural length. For example, in the wrist — which is not as good an example as most but it is much easier for me to demonstrate it up here — if in this individual we have injury to the dorso-flexors of the wrist so that they have great weakness, whereas the flexors are quite strong, and they are left in this position, the return of these muscles, even if they have the potentiality of return, is greatly

*Read before the Medical Society of Delaware, Wilmington, October 14, 1953.
**Professor of Orthopedic Surgery, Harvard University.

inhibited. That again is not solely a characteristic of polio; it is a characteristic of the neuromuscular mechanism if it is insulted in this way by other things as well.

Almost immediately, if we just take those simple premises, one gets an idea of certain features of treatment. Number one, that we don't want to leave the part in fixed deformity even from the beginning. That is the first part of my comment. We must pay attention to the parts, the position of the parts, from the onset of the paralysis. That turns out to be a very important thing.

The next thing is that we must not only pay attention to position but we must carry the parts out of the deformed attitude. In the beginning that can very well be done by ordinary nursing care, and if we have physiotherapists, have them visit on two occasions a day to gradually carry the part out of deformity and develop the range of motion, because if we leave it fixed that is where it is going to be, and it is going to inhibit what we are trying to accomplish.

If we may start in with the slides for a moment we will swing through this.

(Slide) Here is an individual who is in the acute stage, and merely to represent a point, you will notice that this child has a pelvis, if you notice in the recumbent position, that is tilted up into flexion. The foot is externally rotated. That individual has a good bit of so-called muscle spasm in the flexors of his hip, in his ilio-tibial tensor fasciae femoris, and in the flexors generally, so that his pelvis is sharply tilted. You can appreciate the tightness when you bring him up.

That is merely to illustrate the point not only of paralysis — no paralysis would give you that appearance — but the combination of paralysis and the tendency of tightening of these muscles.

(Slide) In talking about this, I am going to use old terminology, in which we speak of the acute stage as being the febrile, the period of febrile illness, and ordinarily we say that the acute stage, for purposes of our discussion, ends about 48 hours after the temperature is normal. I can remember when acute stage was used for the whole sensitive period. This is not our habit, but it is the period when the disease may increase in degree of paralysis and in degree of illness, and, just for giving a practical deadline, we will say 48 hours after the temperature is normal.

In the convalescent stage, which is from that time until spontaneous recovery of muscles has ceased, and ordinarily we think of that as about 16 months. That is a little long. We will see the curve of recovery in our cases in just a moment.

In the first part of this convalescent stage the muscles are quite sensitive, and in treatment we have to obey that sensitivity. Mauling of sensitive muscles gets you nowhere. On the other hand, we are confronted with the problem in which we want to get a full range of motion, and we don't want the part to be in deformity.

The sensitive phase may last several days, weeks or months. Then we come to the asensitive phase, where the muscles have the potentiality of recovery and sensitivity is not one of the features of the disease.

Finally, the chronic stage, which I would only like to say does not mean that the patient is through. He can be rehabilitated by surgical measures, by training, and by various other things. I just wanted to have a common definition with you. These are terms that we all use. But your definition may be a little different from mine.

(Slide) This is the curve of recovery of musculature, as we see it in our cases. You notice this is ten months after onset. You see that for the first four months the curve of recovery is quite steep. It flattens out very perceptibly between four and ten months, and at sixteen months the recovery is practically at an end.

(Slide) Nobody keeps in this position all the time, but ordinary nursing care and the bed board, and so on, are helpful. If you happen to think about it, the foot is the one thing that gets into

trouble no matter what position you are in. If you are on your back, it drops down. If you are on your face, it is pushed into the plantar flexion. The foot board is a helpful thing. Most other things in the sensitive stage you can pay attention to by just ordinary position.

(Slide) Starting early passive motion to develop ranges of motion is a fundamental thing from the beginning. Those hands belong to someone in the darkness, showing the beginning of early passive motion to emphasize it, and I mean right in the beginning. Even in the febrile period a little bit of motion with ordinary nursing care, but the average passive exercise starts 48 hours after the temperature is down.

(Slide) Hot packs. Heat is helpful, not as a curative thing, not as having any dramatic effect, but if you've got a sore shoulder, heat helps get motion started. Heat helps, if the patient is very sensitive, to those areas that are sensitive. We frequently apply heat immediately prior to exercise to develop motion. It has no more dramatic effect that that, in our opinion. We put on our packs to areas that need it, often the back, and maybe around the shoulder, a lay-on pack, probably changing it once in thirty minutes: fifteen minutes on, add another one for fifteen minutes, and maybe two or three times a day, depending on sensitivity. We do not believe in packs every minute.

(Slide) What is the effect of a pack? In our laboratory some time ago, Dr. Gucker having done a good part of this, we put on hot packs with thermocouples in the skin, and it is quite dramatic. The dotted line is muscle. You can understand that if you have a hot pack on the skin, and you have a thermometer there, it is going to be hot, but in the temperature of the muscle itself you notice that the temperature goes up from 92 — this is Fahrenheit, which make it non-scientific — up to about 104. So that actual temperature in the muscle, with one of these hot packs, rises in that strong way.

That's fine, except the thing that really was interesting about this was to find out that it lasts much longer than you think. So that even for three hours the temperature of the muscle was above that at which you started, by a very perceptible degree, and particularly high for two hours. I think that gives us a little feeling about the value of hot packs.

(Slide) Very soon we start with carrying on passive motions. We are beginning to stretch a little that foot. If we allow it to get into equinus, it will become fixed there. If the muscles opposing that position are weak, they will stay weak, and they return much less rapidly and much less effectively.

(Slide) The next thing in general planning — and this is from the beginning, and that is why I am emphasizing it — is to develop active exercises which are really designed upon the weakness of the muscle. You are more in the Baltimore area so you think of muscle in terms of percentage, while we think more in English terms and we have zero muscle, for example. I take it a zero muscle is still zero in percentage. As I remember, a trace muscle is 10 per cent, and so on. We have been partial to the English terminology because percentage connotes accuracy. The percentages as we use them in muscle examination aren't really percentages of power, and since I was brought up the other way I have never shifted. This is the old terminology as developed by Wright and Lovett years and years ago.

But based upon an accurate analysis of the individual muscles, active exercises are started. We don't wait for three weeks or four weeks or six weeks to start active exercise. We start them almost at the beginning of the convalescent stage, starting with a few muscles and carrying them along. What I am trying to emphasize is that we don't mark time, and we get going in a combined fashion.

I think it is well for me to interrupt at this juncture just to state a little philosophy that we follow at our place. As we go along we appreciate that there are two phases to this treatment. One is medical and the other is with someone who is concerned with musculo-skeletal

disease. In our particular institution it turns out that the orthopedic surgeon has long had this interest, so that the way we work it — and you will adapt your arrangements to your own personnel — is that a patient is admitted on our pediatric service. Before he can even have a spinal puncture, the orthopedic resident must see the patient. That is first to emphasize the importance in a teaching setup of two types of interest in the case, and secondly, sometimes muscle examinations and sensitivities are complicated by the punctures, as you well know.

From then on, the pediatrician is responsible for the general care of the patient, primarily for the respiratory problems, if they arise, whereas the orthopedist is concerned with all the care of the musculo-skeletal system from the beginning, and indeed consults in the respiratory phases as well.

That has been very beneficial in the teaching mechanism to broaden the horizon of the pediatrician in his care, and the orthopedist in his care. It sounds like it would be a house divided which cannot stand, but it stands very strongly. So when the time comes where rehabilitation alone is the problem, the individual concerned with that has been following this patient all the time and there is a very smooth transition.

To go back, the active training of muscles is based upon their weakness, and the philosophy of trying to make these in simple general headings, the philosophy of training of the muscles, is to have the weak muscle do what it is supposed to.

You say that's all right, but it can't do it. Well, if it can't, you help it. Even if you can't feel a contraction you help it until it becomes determined that the muscle will not recover. That doesn't mean you go on for years doing the same thing, but there are certain rules and certain findings that will allow you to evaluate what it is going to do, although right at the start you won't be able to tell.

If I were to complicate this statement, I would say that you have the muscle do what it is supposed to do and prevent muscular substitution, because if you allow muscles to substitute for an action you really develop new patterns of habit which will complicate the return of the muscle, and even its full position in the pattern of motion.

We have, then, ranges of motion, prevent deformity, exercises for muscle in specific weakness.

(Slide) This, after all, is just an exercise for an antero-tibial muscle, being sure the muscle itself does what it is supposed to, which demands a fair knowledge of muscle phsyiology, but not as complicated as you might think.

(Slide) This shows the curve of recovery in muscles. These are zero muscles that won't contract; 1-plus muscle, which is a trace muscle; poor, and fair. A fair muscle will just lift against gravity. This is a series of muscles showing their pattern of recovery. You notice that a zero muscle never gets better than a trace muscle on the average, if it is that way at two weeks. A month later it is still better defined what it is going to do. On the other hand, muscles that can really be felt to contract in two weeks have a much better chance to recover, but when they are poor they really have good potentialities of recovery if that is their power at two weeks. The longer they go without showing definite recovery the more definite it is where they are going to be and that they are not going to recover.

(Slide) We have mentioned the importance of preventing deformity. Casts should be used freely, if need be, after that very early sensitive stage, not as fixed things but as removable bivalve things. You see the straps on there. You can't expect a child to stay down against a foot board, a child of three, and yet if you allow the foot to drop into a deformed attitude it is going to become fixed. So free use of casts after that early sensitive phase is in order.

(Slide) The foot and the hand particularly require it.

(Slide) Then active exercises are increased as the patient can do it. If he needs to be sidewise to remove gravity, as here on a board, that is the way to do them. Likewise, as he reaches the asensitive phase, you must stretch the muscles out at that stage, not hurting them, so that we have the natural length of the muscle, which is being done here.

(Slide) Water is very helpful indeed as an exercise medium. Particularly, it allows you to apply heat at the start of your exercise regimen. So we use a Hunter tub, if it is convenient. It isn't necessary. But with warm water, maybe at 104, or as tolerated, a patient tends to relax before exercise, and then the exercise can be carried out there.

(Slide) I would like to emphasize that certainly you must observe the patients from the beginning to see if they stay in a fixed deformity. You walk around and you see a patient on his back lying in a little curve. If one doesn't get at that curve from the beginning, the potential amounts of severe deformity are very great.

(Slide) Here is a child — hard work at stretching it. It is so fixed that even on stretching it it doesn't want to get out of deformity. We will even stop at that stage and put on a turnbuckle cast, and very often we feel it prevents a severe scoliosis.

(Slide) In trying to move along rapidly, I would like to emphasize that we don't allow the patient to lie down by the hour. As soon as they have reached the period when the sensitivity is decreasing, they are turned up in a supported position. I am assuming these patients are really involved in a significant way. The treatment of a mild polio with no paralytic involvement is another thing, of course, entirely. But this type of bed will allow the individual to be turned up gradually stretching him out, and gets him going.

(Slide) This shows that the next phase of exercise is exercise against resistance; in this instance, gravity is the resistance. You remember that active exercises in the beginning are designed to make the muscle do the job it should. We can't discuss the details of when one shifts in its characteristics, but gradually, as they do things — and it really works in a pattern — you give the muscle more to do, first against gravity and then against resistance.

On the other hand, the problem in the convalescent stage is not to make the muscle strong. It is to make it do what it should do in the pattern.

(Slide) So after individual muscles are well squared away, we are concerned with how they do things. We get them up. If at first they tend to be in deformity sitting, it needs to be supervised.

(Slide) In walking too, maybe they have normal arms but a little weakness in the legs. The use of crutches to assist is indicated. If an individual reaches the stage where they can walk normally, that in itself is a good exercise, but one must supervise it to be sure they don't develop bad habits again. If they do it in the beginning they get a poor habit of gait, which inhibits their normal activities in the future.

(Slide) Support of braces we use as necessary. We are only going to go through the early phases. Here is a curvature of the spine which shows a marked curve, and with a mobile removable brace you see the spine can be held. Sweeping the country has been an idea that braces and casts are pernicious. They are the most helpful thing you can imagine if you really need them.

(Slide) Here is the individual showing his brace on and off.

(Slide) Then if they need braces when they get going, they should be light and supportive, if possible. To clutter them up with a heavy brace early to protect a muscle we find is an unsatisfactory technique. On the other hand, if they have a weak gastrocnemius and you can help the little spring take-off and teach them to use crutches, that is another thing.

(Slide) There used to be a lot of honor if you had a patient with polio and he didn't need a brace. Here is a boy who

couldn't walk without crutches, but with a brace he can walk around.

(Slide) As I reach the final part of my comments, I would like to remind you that too often we see a patient through the acute stage and do not carry through in the way we might. It is well to state that any patient that has a significant degree of paralytic disease needs to be followed a little longer than you might think. This statement only becomes of great importance in growing children. Here is just the point. Here is a boy—this photograph was taken about two years after his disease—who has, you might say, a little right curve. Well, let's look at his x-ray.

(Slide) It is certainly very little. It just turns out. Due to certain reasons that we had, we took photographs of this boy at two-year intervals. He was 11 then. He was reaching the period of rapid growth of his spine, the maturity of his spine. At any rate, here he is six years later. (Slide) You see how terrifically deformed he is. This isn't an isolated example. Look at his spine through the x-ray (slide). It's a very disconcerting thing.

So if they have paralytic disease there still may be deforming tendency or muscle imbalance from contraction if you haven't completely corrected it, and they may rise up to bother you in the future.

(Slide) I only want to say this one final thing, and that is that the worst deformities that I see are in patients who have had respiratory disease who have been put in the respirator without proper care of their musculo-skeletal system. I would only like to counsel you — we haven't time to discuss the respiratory system, although we are interested in that phase—that from the beginning, through portholes, start ranges of motion as soon as possible, and early weaning from the respirator is important, even if it is only for a few minutes. But when they are out, even for a brief moment, do early passive motions.

(Slide) As of recently, the chest respirator has helped a great deal, first putting it on in the tank to give them confidence.

(Slide) This is the rocking bed. The next weaning stage is from the chest respirator to the rocking bed, which allows them to have exercise and also is of help metabolically.

I only mention this, really, to come back to one point, that the musculo- skeletal system is important in the respiratory form. Too, it is the chief problem in poliomyelitis except for the very early stages in which the possibility of bulbar and respiratory complications make it an acute problem in certain instances.

300 Longwood Avenue.

DISCUSSION

DR. T. B. STRANGE (Wilmington): I enjoyed Dr. Green's paper very much, and find it very easy to discuss because I agreed with everything he had to say.

Several points were of particular interest to me. First of all was the fact that recovery of muscle continues up to sixteen months. I think this is a thing we should all remember, and it is something that we can keep to reassure parents.

Another point of interest to me was that the hot packs cause increase in the muscle temperature for up to two hours. I found that very interesting. I have often wondered how long such heat did last.

Another point, the early active motion of paralyzed muscle, as well as passive motion, I found of interest because some of us are fearful of moving the extremities.

Another point was the fact that braces and casts are used, as he pointed out. They have sort of fallen into disrepute.

The last point was the long-term supervision of these cases, which is so important.

I would like to point out on my own how important the prevention of deformities is, in that they are the responsibility of the treating physician. Almost all deformities are preventable, and those that do develop can be kept in reasonable lim-

its. Of course, no doctor should accept a case of polio unless he has an understanding and working knowledge of the pathogenesis of musculo-skeletal deformities, and a knowledge of the relative importance of various deformities in their relationship to each other. He should be able to recognize the normal and abnormal positions and movement patterns, and should be familiar with the available tools to care for the factors that result in the deformity.

It is obvious to me and orthopedists, the latter being the physician who is called in to treat the deformities after they do develop, that he should have been called in early before they have a chance. It may be said that when a deformity is easily recognizable, it is then too late to do much about it.

I would like to point out to the general practitioners that all of us who treat polio here in this state, as well as New Castle County, have available to us teams consisting of a pediatrician and orthopedist, who will go to any home with a general practitioner, or whoever is treating a polio patient, and help them to institute the treatment.

DR. A. R. SHANDS (Wilmington): We have heard a very masterful presentation of the early care of polio. There is certainly no part of what Dr. Green has given us that I can disagree with. I hope that those of you who are treating these cases will remember a few of the important points of his talk.

I would say that the way we have been treating patients here in Wilmington is pretty much as Dr. Green has outlined to us. The early passive motion, hot packs, is something which we have in this community taken up certainly in the last twelve or fourteen years since I have been here, stimulated a good deal by some of the teachings of Sister Kenny.

Twenty years ago or more, I don't think we were perhaps doing as much of that in Baltimore, or in Wilmington, or North Carolina or in Washington. In certain parts of the country, such as in Boston, I believe that they were.

I think Dr. Green's point of these cases being under the care of the medical man, the pediatrician, somewhat interested in the musculo-skeletal system, is well taken. The orthopedist is interested in the musculo-skeletal diseases, but there are a great many others. In recent times, scientists have become intensely interested in musculo-skeletal disease. But the point is that there should be somebody who has a very deep interest in that particular part of the disease, in addition to the pediatrician or the general practitioner, or the internist.

Dr. Green's reference to the respirator case brings to mind an experience I had with Dr. Green in Boston a little over a month ago. I went to the Wellesley Convalescent Hospital, polio unit, where they have twelve or more of these very severely crippled respirator cases. The unit is supported largely by the National Foundation for Infantile Paralysis. In making rounds and seeing those cases you cannot help but think, and think hard, as to what is going to happen to these poor souls who are as severely paralyzed as they are, and, who, in many instances certainly, cannot psychologically exist outside the respirator. They form the most serious problem which we are trying to meet in this care of polio today.

Dr. Strange said something about the prevention of deformity. We so often see polio cases who come from general practitioners in rural districts in particular. I used to see a great many in North Carolina, where you didn't hear about neurosurgeons or those interested in musculo-skeletal disease. So often, deformity is the biggest problem we orthopedists have to contend with.

DR. GREEN: I wish to thank Dr. Strange and Dr. Shands for their kind words. One thing Dr. Strange brought up was the question of early active exercise, with the insinuation that perhaps he didn't do them quite as early, yet entering into them with apparently the same philosophy.

I would like to add to that that the thing I particularly deplore is early in-

discriminate motion, having the patient do as much as he can in the beginning, because then he develops a pattern of muscular substitution, he wobbles around as much as he can, and he tends to keep the pattern. He uses the muscles which come easy in their use, rather than the pattern that he should. So that a good many patients who are limping around could be much better off. They started off early, weren't guided, and developed a bad gait.

Some of us might give a patient a good deal of better advice than we do, because a great deal of gait training is just watching and guiding properly. But early active motion that is too high in producing fatigue is undesirable.

THE INCIDENCE OF COMMON BILE DUCT DISEASE FOLLOWING SURGICAL EXPLORATION*

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The purpose of this report is to call attention to the incidence of uncorrected abnormalties in the common bile duct which remain after surgical exploration of the duct. Postoperative cholangiograms show a relatively high incidence of poor results following accepted surgical methods now in general use for exploring the bile ducts. It is not our purpose here to discuss the cause or prevention of such complications.

The recurrence or persistence of symptoms following cholecystectomy is a frequent problem which confronts the surgeon, puzzles the family doctor, concerns the internist and gastroenterologist, and incapacitates the patient. Perhaps more disturbing is the persistence or recurrence of symptoms following exploration of the common bile duct. In both of these circumstances one suspects that the operation has been incomplete or the diagnosis in error. Postoperative cholangiograms frequently give helpful information and may point an accusing finger at previously unrecognized or overlooked pathology in the duct.

Autopsy statistics show that calculi are overlooked at exploration of the common bile duct in one-third of the cases.[1] The study of living patients reported here revealed a lower incidence of duct stones after exploration, but is no less significant.

Postoperative cholangiograms in 74 consecutive patients of 8 qualified general surgeons were reviewed to determine the incidence and types of residual bile duct pathology. The films were obtained after injecting a non-irritating radiopaque solution via T-tube into the common bile duct on the 6th to 10th postoperative day. Findings of these x-ray examinations are summarized in a graph (Fig. 1). Normal findings were demonstrated in 56.7 per cent. Stones remaining in the duct after surgical exploration were demonstrated in 24.3 per cent. The remainder, 19 per cent, showed partial or complete obstruction due to stricture, stenosis, sphincter spasm, or tumor. In all of the patients who had abnormal findings (43.3 per cent) the lesion was located in the terminal 1/3 of the duct. This is the retro-duodenal or trans-pancreatic portion of the common duct which is least accessible by the usual surgical methods.[2]

It is believed that the true incidence of obstructive disease following common duct exploration is not so high as the findings in this review would seem to indicate. We have no ready method for knowing the number of patients with T-tubes who made complete and uncompli-

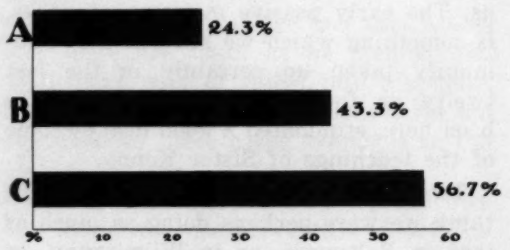


Fig. 1. Review of 74 consecutive postoperative cholangiograms show: A—Stones remaining in the common bile duct; B—Total showing abnormal findings in the common duct; C—Normal.

*Read before the Medical Society of Delaware, Wilmington, October 13, 1953.
**Respectively, Attending Chief, Surgical Service, and Associate Radiologist, Delaware Hospital.

cated recovery without having a postoperative cholangiogram. When the T-tube can be clamped off for 48 to 72 hours without bile leaking from the wound, without pain or colic, without jaundice, and with evidence of bile in the stool, one is justified in assuming a patent biliary tract exists and the T-tube can be safely removed. In patients who showed such clinical evidence the surgeon may not have requested a cholangiogram, reserving this special study for patients who showed clinical signs of duct pathology. The fact remains that a high incidence of disease was revealed in the group who had postoperative cholangiograms.

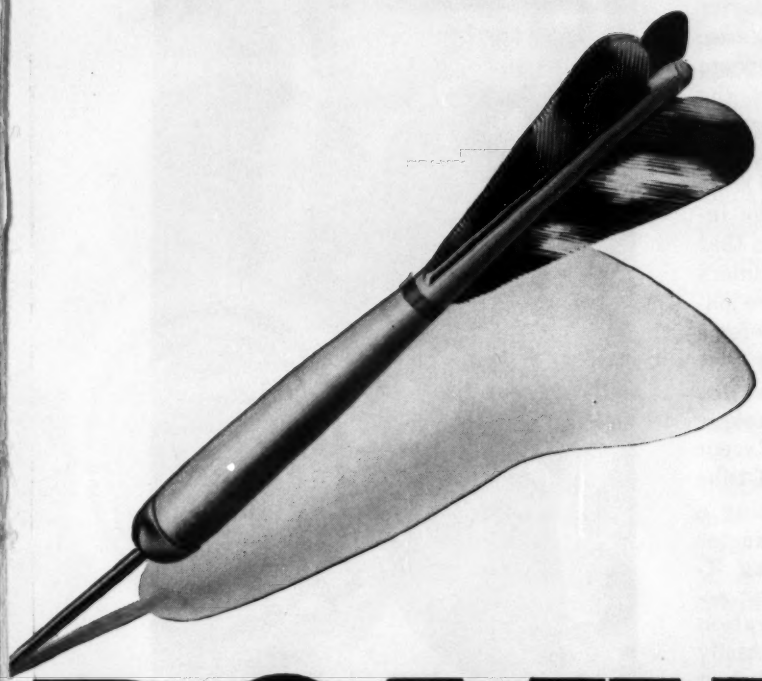
In all the cases included in this study, postoperative cholangiography was carried out. In one case an operative cholangiogram was done, followed in a week by a postoperative cholangiogram.

The following routine technic is employed for postoperative cholangiography: The patient is placed in the supine position on a radiographic table equipped with a Potter-Bucky diaphragm and fluoroscope. A syringe containing 20 cc. of iodized oil is connected to the external limb of the T-tube and under fluoroscopic control a few cubic centimeters of the contrast material is injected. Spot radiographs are made as indicated. The patient is then centered over the Potter-Bucky apparatus and radiographic exposures are made in anterior-posterior and right posterior oblique projections during the injection of additional contrast material. All films are developed and examined, and if satisfactory films have been obtained the examination is concluded. If not, the process is repeated. Amyl nitrite may be given to differentiate spasm from stenosis or stricture.

During fluoroscopy the contrast substance spreads out along the common duct from both internal limbs of the T-tube. The diameter of the common duct is noted. It varies from 0.2 cm. to 0.8 cm. normally but may be considerably larger if an obstruction is present.[9] The distal end tapers in the region of the junction with the duodenum. If no obstruction is present the iodized oil passes promptly into the duodenum. In case of complete obstruction no contrast media passes into the duodenum, and with an incomplete obstruction a limited amount passes the sphincter of Oddi. The degree of filling of the hepatic ducts is often a guide to the presence or absence of obstruction. On the normal, the right and left hepatic ducts are usually visualized but the smaller hepatic ducts are not well outlined. (Fig. 2). In obstructed cases the entire duct system is often opacified. (Fig. 3). We consider pain during injection, or its absence, of considerable importance. The patient experiences no pain in unobstructed cases, but with obstruction there is pain often directly proportional to degree of obstruction. Excessive pressure during injection should be avoided. If a calculus is large enough it may be identified fluoroscopically but in the case of a small stone or a large patient it is generally visualized only on the films. A solitary stone causes a concave defect in the distal portion of the duct if

Fig. 2. Normal cholangiogram.

ACH



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the stone is radiolucent, as the majority are. Multiple radiolucent calculi cause mottling of the duct. Stenosis and spasm produce similar narrow areas in the shadow of the duct and it is in differentiating between these two conditions that antispasmodics are of value. (Fig. 4). If the constriction disappears under the influence of relaxing drugs, we assume that the changes were due to spasm. Tumors of the head of the pancreas and the papilla of Vater produce irregular defects which are usually convex. (Fig. 5).

There is no reliable visual method for determining common bile duct pathology without a T-tube in the duct. Except through manometric studies via a T-tube there is no certain method for making a diagnosis of dyssynergia of the sphincter of Oddi.[3] The use of an indwelling T-tube drain in the common duct after accepted procedures for duct exploration seems to be a desirable precaution chiefly because of the possible presence of duct pathology which may have been overlooked at operation.

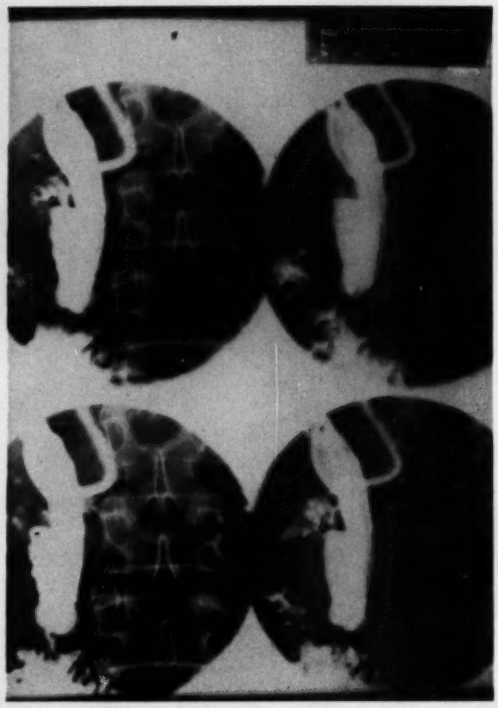

Fig. 4. Postoperative cholangiogram showing uncorrected stenosis or stricture at distal end of common duct.

Fig. 3. Cholangiogram showing stone in distal portion of common bile duct after surgical exploration.

Fig. 5. Tumor of the pancreas invading the distal portion of the common bile duct suspected from surgical exploration and proven by autopsy.

Mechanical obstruction of the duct may be confused clinically with functional abnormalities involving the sphincter of Oddi. The absence of jaundice does not mean there is an absence of duct pathology. Biliary dyskinesia is not associated with jaundice, and about 45 per cent of patients with stone in the duct do not have jaundice. Virus hepatitis is the most common cause of jaundice and not pathology of the bile ducts.[4]

The incidence of postcholecystectomy syndrome and biliary dyskinesia parallels the incidence of bile duct pathology demonstrated by postoperative cholangiogram. Of patients who have had gall bladder or bile duct operations probably 20 per cent to 62 per cent have residual bile duct pathology as evidenced by symptoms.[5,8]

Fibrotic stenosis of the terminal common duct or stricture at the sphincter of Oddi appears as an abrupt narrowing on the cholangiogram, though this may not be easily distinguished from stone. A similar appearance can result from a localized inflammatory lesion in the head of the pancreas, and less often from tumor. (Fig. 2, Fig. 3, Fig. 4) Cholecystography before operation is not a reliable method for making a diagnosis of stricture or stenosis at the sphincter of Oddi.[7] In patients who have a clear-cut history of biliary colic, cholecystogram which shows delayed emptying of an otherwise normal gall bladder after the fatty meal is suggestive of obstructive disease at the sphincter of Oddi.[8] Cholecystectomy without sphincterotomy or transduodenal ampullostomy does not relieve the symptoms in this group of patients. The evidence of distal duct obstruction is more convincing when the hepatic and pancreatic ducts are visualized on routine cholecystogram, though there is rarely sufficient sustained back pressure to show them by this method.

A careful history and physical examination is a valuable aid in the proper interpretation of bile duct x-ray studies. The use of morphine is known to cause spasm of the sphincter of Oddi and should not be given within 12 hours preceding cholangiography. The use of a sublingual tablet of nitroglycerin during cholangiographic examination may aid in demonstrating patency of a spastic sphincter and thereby differentiate stenosis or fibrotic stricture of the duct.

Cholangiography at the time of operation requires special Bucky diaphragm equipment for the operating table, which most hospitals do not have. We have not used this method as a guide for exploring the common duct, with the previously mentioned exception of one case, but believe it has some limited merit. Errors of interpretation of wet films made in the operating room may be more frequent, due to spasm or atony of the sphincter of Oddi resulting from manipulation of the duct, anesthesia, narcotic, or other medication employed in conjunction with the operation.

SUMMARY

A review of 74 consecutive cholangiograms revealed pathology remaining in the common bile duct in 43.3 per cent. Stone remaining in the duct after exploration was demonstrated in 24.3 per cent. Partial or complete obstruction of the duct due to spasm, stricture, stenosis, or tumor was found in 19 per cent.

The incidence of persistent or recurrent symptoms following cholecystectomy and exploration of the common bile duct parallels the incidence of postoperative bile duct pathology demonstrated by cholangiogram. The injection of a radiopaque non-irritating solution via T-tube into the common duct is believed to be a reliable method for demonstrating, by x-ray films, residual bile duct pathology after operation. The technic used in these cases has been described. Findings obtained in this manner suggest that standard methods of surgical exploration of the common duct now in general use are incomplete or unsatisfactory.

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DISCUSSION

DR. JAMES G. SPACKMAN, Wilmington: I think your cholangiograms were excellent. I entirely agree with Dr. Preston about postoperative cholecystectomy, that they are frequently a disturbing factor. I also believe that all of the methods that we have at present leave much to be desired. My impression is that the most frequent cause of postoperative cholecystectomy complaints is an overlooked stone or stones in the common duct. Second, a stricture of the common duct perhaps due to rough instrumentation of the duct. Third, an intermittent or prolonged spasm of the sphincter of Oddi.

Exploration of the common duct requires a gentle hand, good anesthesia, a dry field, a good light, competent assistance, and proper instruments. Good control of the duct by traction sutures or non-traumatizing forceps is also important. All cases having common duct exploration have a T-tube sutured in place, and routinely have a cholangiogram before the tube is removed. In cases where the history would lead one to suspect common duct disease, a planned immediate cholangiogram is done.

Some of our false positives may have been due to instrumentation and spasm of the sphincter, and inability of the dye to enter the duodenum. Our experience with the Kirby-Thurston electro-acoustic locator has been unsatisfactory due to the inability to tune out loud static.

Jaundice is the most constant finding in cases of obstruction due to common duct calculi. The jaundice may be slight and transitory and may show when a urinary specimen is shaken, weeks before it is clinically evident. It may be present in one specimen and absent in the next. The figures of jaundice due to common duct stone are variable: 73 per cent by Judd and Marshall; 87 per cent by Jordan and Weir.

Except for the removal of stones impacted in the ampulla which could not be displaced upward into the supraduodenal portion of the duct, I have had no experience with sphincterotomy.

A review of 56 cases at the Memorial Hospital in the past five and a half years having 68 cholangiograms showed 20 per cent were immediate and 80 per cent delayed. In a number of cases of immediate cholangiogram the dye did not enter the duodenum, while a later film showed prompt entry of the dye into the duodenum and no common duct defect.

In the group of 56 patients having immediate and delayed cholangiograms or both, stones were found in five cases and spasms in five.

Because of the prominent place in Dr. Preston's paper of cholangiography, I have a slide which may be of interest. (Slide) This was done when we first started to do cholangiograms, in February, 1937. This case was mistaken for a marked pancreatitis of the head. It was 8 cm in diameter, hard and firm. Later operation showed it to be carcinoma of the pancreatic head with liver metastasis. A by-passing cholecyst-gastrostomy was done. The patient later died of peritoneal carcinomatosis with ascites.

DR. L. M. DOBSON, Milford:

The facts that Drs. Preston and Alden have brought to our attention certainly are eye-openers. They justify the conclusion, I believe, that the present accepted methods commonly employed in exploration of the common duct are unsatisfactory.

Reviewing this subject, we must not conclude that this is a problem that faces only Delaware doctors. Other medical centers have had similar results. I do not know in what percentage of cases

that have a cholecystectomy there is also exploration of the duct. I understand that surgeons are generally agreed as to the indications for exploration of the duct, but I also understand that there is quite a wide variation in the percentage of cases that are explored in different medical centers. Some have said that the more ducts are explored, the more stones are found.

It seems to me that some method of examination is needed at the time of operation to help the surgeon decide what case should be explored, and why. I have had no experience whatever with operative cholangiography, but it seems to me that with cooperation between the anesthesiologist, surgeon, and radiologist, a technique could be perfected.

I am wondering, first, just how accurate the study is, and whether any cases in which the cholangiograms postoperatively were reported negative and serious disease found later.

Second, I would like to know from the surgeons if operative cholangiography could be developed to a diagnostic accuracy as the present postoperative cholangiography, would they be willing to accept the findings of cholangiography for exploration. Perhaps this might cut down the number of explorations of the duct and let the surgeon explore only when there is good reason.

DR. PRESTON: Dr. Spackman has attempted to use this electrical device which he has not found successful because of the excessive static in it. You get a clicking noise when your electrode touches a stone, but when there is so much static in the machine that it is sometimes difficult to hear it, I think his feeling is that it is not entirely satisfactory. I have not used that, although I understand in Philadelphia they use it with success.

Dr. Dobson inquired about the percentage of patients who come to operation for gall bladder disease and who are explored for stones in the duct. It is our practice to explore only when there are definite indications at the time of operation that there is some disease in the duct. This is evidenced by several things. Usually, the duct is dilated when there is partial or complete obstruction. Also, if the duct is thickened and grayish white in color, this is an abnormal duct and often harbors disease, either infection, obstruction, or both. Then, by external examination, palpation, and by visual methods, if we find disease we feel we are then justified in opening this duct to see if there is obstructive pathology. This occurs in about one in four cases of patients that come to operation for biliary tract disease.

I was speaking to Dr. Peasley in the Mayo Clinic in July and I asked him in what percentage of his gall bladder patients did he explore the common bile duct. He told me that roughly 25 per cent were explored. I asked in what percentage did he find obstructive disease. He said he found stones in approximately one-half of those he explored, bringing it approximately to 12½ per cent.

This, I think, is generally true in large clinics in our country. In our experience we have found it to be true.

Dr. Dobson also raised a question of preoperative x-ray study to demonstrate obstructions in common bile duct. I understand that this is a technical difficulty which has many aspects. The difficulties are those of interpretation, largely, and also in obtaining satisfactory films. I am told that there are new radiopaque substances which are being experimented with at present which will demonstrate adequately the extra-hepatic biliary system before the gall bladder has been removed. I believe that the dye, when given in a case of a gall bladder that is functioning, when the gall bladder begins to contract the films are made, and often the radiologist can demonstrate the outline of the hepatic system.

In the cases in which this is successful, I believe it has some reliability. I think if you can demonstrate a duct which is normal in size, and you can see no obvious convex shadow in the distal portion of the duct, you may assume then that this probably is a normal duct. But I am not convinced that that is the whole an-

swer, and I am not sure that we can rely yet on cholangiography of this type for deciding whether or not the patient should have an operation. I believe that the patient's symptoms are an important guide. If, for example, your patient has symptoms of acute and severe colic which recurs at intervals of less than two weeks, it requires morphine or other narcotics for relief, it is not adequately controlled or relieved by diet or medical measures, then certainly with radiographic evidence to support this evidence of biliary tract disease, I think the patient should be explored. But to rely entirely upon radiographs to decide whether or not the patient should be operated upon, I do not have sufficient confidence in the films to make that decision.

INTRAMUSCULAR TRYPSIN IN ACUTE POLIOMYELITIS*

GEORGE J. BOINES, M.D.,**
Wilmington, Del.

Anti-inflamatory effects, ranging from good to spectacular, have been reported for trypsin.[1,2,3,4,5] It was also observed that edema is favorably influenced and pain quickly controlled. Suggestions have been offered[2] that these phenomena might be due to: (1) fortuitous circumstances; (2) increased lymphatic drainage in area due to mobilization of coagulated lymph; (3) increased capillary blood flow due to mobilization of clumps of blood cells; (4) increased phagocytosis; or (5) the activation of other enzyme systems.

In addition to the anti-inflammatory, anti-edema capacities of trypsin, it was observed that blood sludging characteristics were reduced by trypsin.[6] This was in contrast to heparin, which does not change clumping characteristics, but does effect the lodging of these clumps.

The mucolytic effect of crystalline trypsin has been used in poliomyelitis patients with tracheotomy.[7] The investigators were frequently gratified to find stringy, tenacious exudate assume a semiliquid character following trypsin instillation.

*Read before The Delaware Academy of General Practice, Wilmington, December 11, 1954.

**Attending chief of Communicable Diseases and Poliomyelitis at the Wilmington General and St. Francis Hospitals; Lecturer, Department of Biological Sciences, University of Delaware.

With regard to the morbid anatomy of poliomyelitis, the lesion in the first stages is characterized by engorgement and thrombosis of small vessels, with perivascular exudation, minute blood extravasations, and small cell infiltration of the surrounding tissues. In the second stage there is necrosis of the tissue from which blood has been cut off, and in the third stage, absorption of the necrosed products, with contractions and cicatrization. Two views have been held to explain the pathology of these appearances: the condition may be due to a specific infection producing an acute inflammation, or it is a vascular thrombosis due to some altered blood condition, not dependent on one specific infection, but due to various causes.[8]

The presence of edema in the central nervous system affected by poliomyelitis has been adequately described,[9] and that edema of the central nervous system plays a dominant role in producing paralysis has been suggested.[10] The degree of destruction of specific neurones in poliomyelitis may be due to direct viral action and to edema as the sequelae of primarily disturbed blood flow.[11]

Changes in the circulatory patterns of the spinal cord suggest that "many of the factors which enhance the severity of poliomyelitis, or localize the paralysis, may operate through local vascular changes in the brain and spinal cord".[12]

The clinical picture of poliomyelitis may combine the features of an exceedingly complex and varied disease of nerve cells, and those of a variable inflammatory process in the central nervous system.[13] It is suggested "that a more subtle way in which inflammatory reactions might conceivably affect the clinically localizable function is by temporarily interfering with synaptic transmission by nerve cells which are destined to recover from sub-lethal virus effect."[14] A frequent observation is that for several days the lesions of the anterior horns are accompanied with lesions of the parametrial ways, which explains the extensive paralysis at the beginning. When congestion of the parametrial ways is re-

lieved, a part of the paralysis disappears.

Inflammation may be defined as a complex vascular, lymphatic and local tissue reaction elicited in higher animals by the presence of microorganisms, or non-viable irritants.[16]

In vivo, microscopic reactions of the circulatory blood and blood vessels in the bulbar conjunctivae in human poliomyelitis revealed: (1) the majority of the circulatory red blood cells were stuck into two kinds of aggregates, one of which was sufficiently large and rigid to produce intermittent temporary and occasionally permanent embolization of arterioles; (2) many capillary beds were shut, which was suggestive of a disease in the blood volume; and (3) the severity of the intravascular abnormality was roughly proportional to the extent of the symptomatic involvement of the central nervous system.[17] There is reason to believe that "in poliomyelitis patients, multiple temporary embolization of the terminal arterioles is a standard part of the pathophysiology of the disease."[18]

It has been established that inadequate ventilation is a major problem in the acute stages of poliomyelitis, and recourse to tracheotomy is necessary to facilitate access to the tracheobronchial tree for aspiration, lavage, and oxygen therapy. In these tracheotomy cases there is a tendency to the formation of a tenacious, viscid mucoid exudate which interferes with adequate ventilation.

A treatment which would modify this exudate to a more liquid form to permit adequate aspiration resulting in improved ventilation is desirable. Our question was: Would Parenzyme have the capacity to bring about the desired result?

The histopathological changes reported occurring in poliomyelitis established a rationale for our clinical use of trypsin in its medical management.

MATERIALS AND PROCEDURE

Our present report deals with 51 patients with definitely established clinical diagnosis of acute poliomyelitis, ranging in age from 2 years to 32 years with an average of 16.2 years. Of these patients 35 were males and 16 females. Twelve of the males and 6 of the females were bulbar spinal poliomyelitis cases.

We also include one case, male, 28 years of age, in whom tracheotomy was performed before Parenzyme became available. There was difficulty in keeping these patients in "adequate ventilation" because of difficulty in aspirating the thick, stringy viscid exudate.

Crystalline trypsin in sesame oil (Parenzyme*), each cc. of the preparation containing 5 mgm. of trypsin for intramuscular use, was made available for our use. A dosage schedule of 0.5 cc., or 2.5 mgm. of trypsin, every 8 hours for 5 successive days, given deep in the buttocks, and then two doses daily for an additional 7 to 10 days, was empirically decided upon, and has been followed in all cases.

We continued with hyperproteinization[19] and curarization[20] because we observed no muscle relaxation as far as stiffness is concerned with the use of Parenzyme.

RESULTS

Without exception, the well-being of the patients improved following the second or third injection of Parenzyme. The acute toxic manifestations of the viral infection were rapidly modified. The progression of the paralytic processes was apparently arrested after 48 hours of Parenzyme therapy.

A most significant observation was the return of muscle strength in these patients. This return of muscle strength is out of proportion of previously treated 700 acute cases observed in our clinic since 1940.

There was no muscle relaxation as far as stiffness is concerned; however, it was observed that the response to curare was accelerated in the Parenzyme-treated patients. These patients were able to take active exercise earlier and with greater resistance, thus permitting quicker rehabilitation.

Another significant observation was the capacity of Parenzyme to alter the physical characteristics of tracheobronchial exudate in the tracheotomy cases from a thick, viscid, tenacious exudate to

*Parenzyme: National Drug Company, Philadelphia.

a "fluid state" permitting easier aspiration at less frequent intervals resulting in greatly improved ventilation.

COMMENT

We are well aware of such factors as the possibility of a light epidemic; that some patients might recover spontaneously, and the severity of paralysis may vary from year to year; however, we cannot ignore the favorable influence Parenzyme had on the clinical course of poliomyelitis in these 51 patients.

The purpose of this preliminary report is to try to stimulate other investigators to try Parenzyme as an adjunct in the clinical management of acute poliomyelitis. Our results have been most gratifying and we are confident others will experience the same satisfaction of doing the patient the most good in the shortest possible time as we have found in our present small series of Parenzyme-treated poliomyelitis patients.

413 N. Broom Street

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MISCELLANEOUS

Problem Drinker

The "problem drinker" in industry can be cured best by keeping him on the job while helping him to solve his problem, according to an industrial physician.

Allowing the employee to keep working while he tries to stop drinking is like the successful treatment of World War II casualties at the front instead of at rear bases. It gives the worker, like the soldier, "the feeling of courage and pride that one gets by staying in the fight and not retreating." Dr. Thomas H. Hogshead, of the Medical Division of E. I. duPont de Nemours & Co., Wilmington, Del., reported on the company's program in the (June) *Archives of Industrial Hygiene and Occupational Medicine*, published by the American Medical Association.

"Our program is successful," he said. "An estimated 65 per cent of the cases treated have been rehabilitated. The total cost of the program is estimated at less than $100,000. The total gains cannot be measured."

The worker's "need for security, for recognition, for position, as well as his desire to belong and to be led, are all met on the job," Dr. Hogshead said. "Such motivation is of paramount importance in the approach to the problem of alcoholism in industry."

The employee considered a problem drinker is advised he is being turned over to the medical division. At the end of three months the division recommends either that he is trying and should be retained, or that he shows no interest in rehabilitation and should be discharged.

The company cooperates closely with Alcoholics Anonymous, and has a "companywide alert" to the problem and its treatment. "The fact that alcoholism or problem drinking is accepted as a disease by a company so scientific as duPont and treated as any other illness by our medical division has opened the way for the rehabilitation of hundreds of employees," Dr. Hogshead said.

Editorials

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VOL. 27 FEBRUARY, 1955 NO. 2

CLIP AND PASTE

This issue contains a listing of those physicians who have been admitted to membership in the State Society since the publication of our last Roster, in July, 1954. By clipping this list from *The Journal* and pasting it in your copy of the Roster you will have an up-to-date Roster. You kept the Rosters, of course! They cost one buck, and are in rather limited supply.

Likewise, this issue contains the new 1955 Directory Page of State and County Societies. Cut out this page carefully and paste it on the back of your Roster.

Finally, this issue contains a new monthly feature — Coming Meetings. This applies especially to events in Delaware, with an occasional mention of an important meeting near by. As soon as a medical or related event is definitely scheduled please send the item to the Chairman of the Medical Education Committee, Dr. Robert W. Frelick, 1702 Bedford Road, Deerhurst, Wilmington 3, Delaware. Thank you.

ORTHOEPY AND I

It is surprising that the great majority of physicians, traditionally trained to exercise unusual care in the practice of medicine, permit themselves to be careless with medical words. Carelessness in speech is an old American custom. Numerous writers such as Petroleum V. Nasby and George Ade capitalized on this almost universal failing. Currently we are amused by the weird and whimsical pronunciations of our friend Pogo and his Neighbors in Okeefenochee swamp.

It is possible that the common mis-pronunciation of medical words which are used with regularity is because interns and resident staff pronounce words as they hear them used by their senior staff members and perhaps even by their teachers while in medical school. If this be true we should assume an individual responsibility in exercising care in our technical speech. If this were done for one year all of us would profit by having become more proficient in the use of the spoken word.

Just for fun look at the following list of 12 words, pronounce them immediately, and check how you said them on the appropriately phonetically spelled example. Now turn to page 43 where the correct pronunciations are given. If you get eight correct you are very good; ten is excellent and if you get more than ten you may consider yourself to be first-class orthoëpist.

1. Salicylate—(a) sa LIS i late (b) sal i SIL ate (c) SAL i sil ate.
2. Abdomen—(a) AB do men (b) ab DO men (c) ab DOM en.
3. Hyperpnea—(a) hy perp NEE a (b) hy PERP ne a (c) HY perp ne a.
4. Poliomyelitis—(a) Pahl e o my e li tis (b) POLE e o my e li tis (c) pole e o MY e LI tis.

5. Trichomonas—(a) tri KOM o nas (b) tri ko MO nas (c) TRIK o mo nas.

6. Vertebral—(a) ver TEE bral (b) VER te bral (c) ver TIB ral.

7. Esophageal—(a) e SOF a je al (b) e sof a JEE al (c) e so FAJ e al.

8. Cavernous—(a) KAV er nus (b) ka VER nus (c) ka VER NUS.

9. Caffein—(a) CAF fe in (b) caf FEEN (c) CAF een.

10. Respiratory—(a) RES pi ra to ry (b) re SPI ra to ry (c) res pi ra TORY.

11. Flaccid—(a) FLAS sid (b) FLAK sid (c) FLAY sid.

12. Menarche—(a) men ARCH (b) men ARK (c) me NAR kah.

If you don't believe it, check the list in a good medical and a good standard dictionary, which reminds us—that is what we started to editorialize about in the first place.

Jour. Okla. S.M.A., January, 1955

COMING MEETINGS

1955

February 1—Staff Meeting, Milford Memorial Hospital, Milford.

February 2 — Special Meeting, colored sound movies; Surgical Technic. Milford Memorial Hospital, Milford, 8:30 p.m.

February 3 — Staff Meeting, Nanticoke Hospital, Seaford, 1:30 p.m.

February 5 — American College of Physicians, Regional Meeting, Delaware Academy of Medicine, Wilmington, 9:30 a.m. - 4:00 p.m.

February 8 — Delaware Hospital Staff Meeting, Wilmington, 8:30 p.m.

February 8—Kent County Medical Society Meeting.

February 9 — Health Forum—"Old Age Can Be Fun", Edward L. Bortz, Professor of Medicine, U. of Pa. Graduate School. P. S. duPont High School, Wilmington, 8 p.m.

February 10—Visiting Internist — Delaware Hospital, Wilmington. Medical conference at 8:30 a.m., Lecture by Dr. George A. Perea, Associate Professor of Medicine at Columbia, 4:00 p.m.

February 14—C.P.C., Milford Memorial Hospital, Dr. O. J. Pollak and staff, 12:30 p.m.

February 15—New Castle County Medical Society Meeting, Dr. Bronson S. Ray, Professor of Clinical Surgery at Cornell Univ. — "The Diagnosis and Treatment of Intracranial Bleeding" 3:00 to 5:00 p.m., Delaware Hospital, Clinical Session. 8:30 p.m., Meeting, Delaware Academy of Medicine.

February 17—Sussex County Medical Society Meeting.

February 18—Staff Meeting, Beebe Hospital, Lewes.

March 9 — Health Forum—Cancer—Dr. Cameron, American Cancer Society.

March 10 — Visiting Internist, Delaware Hospital, Arthur Merrill, Associate in Internal Medicine, Harvard.

March 15 — New Castle County Medical Society Meeting — "Surgical Lesions of the Pancreas, particularly Chronic Relapsing Pancreatitis", Dr. Jonathan E. Rhoads, Associate Professor of Surgery at U. of Penna. 3:00 to 5:00 p.m., Memorial Hospital, Clinical Session. 8:30 p.m. Meeting, Delaware Academy of Medicine.

March 22 — St. Francis Hospital Staff Meeting, Wilmington.

March 29 — Delaware Psychiatric Society, Delaware Academy of Medicine. Judge John J. Biggs.

March 29-April 1 — Annual Postgraduate Institute, Phila., Co. Med. Soc., Bellevue-Stratford Hotel, Phila.

April 5 — Memorial Hospital Staff Meeting, Wilmington.

April 13 — Health Forum—"Overweight and Underweight" — Dr. Norman Jaliffe, New York College of Medicine.

April 16 — Symposium: Gastroenterology. Delaware Academy of General Practice.

April 19 — New Castle County Medical Society Meeting—Dr. Hugh H. Hussey, Jr., Associate Professor of Clinical Medicine, Georgetown University. 3:00 to 5:00—St. Francis Hospital, Clinical Session. 8:30 p.m., Delaware Academy of Medicine—"Recognition of Pulmonary Embolism".

April 25-29 — American College of Physicians' Annual Meeting, Philadelphia.

April 26 — Wilmington General Hospital Staff Meeting, Wilmington.

May 3 — 25th Anniversary Meeting, Delaware Academy of Medicine. Dr. Detlev W. Bronk, President, Rockefeller Institute of Medical Research. Dr. John A. Monroe, Professor of History, University of Delaware.

June 6-10 — American Medical Association, Annual Meeting, Atlantic City.

Curative Workshop Day at Wanamaker's

The fifth annual Curative Workshop Day at Wanamaker's, Wilmington, sponsored by the Junior League of Wilmington, will be held Wednesday, March 30 from 9:30 a.m. to 9:00 p.m. A percentage of sales that day will go to the Workshop to be added to the Building Fund Campaign.

If you can't come in, write or phone. Wanamaker's will be well stocked with new spring merchandise at tremendous savings. You may start buying today! Advance purchases amounting to $15 or more in any department may be held for you until March 30, if you ask that credit be given to the Delaware Curative Workshop. Save your shopping for March 30 and help the Junior League boost the Building Fund.

Laboratory Technicians' Meetings

During the past two and one-half years medical technologists residing in Kent and Sussex County met once a month with the pathologist to discuss various scientific problems of common interest to the group. In 1952-53 all sessions were devoted to the study of blood dyscrasias. In 1953-54 the topics of discussion covered a variety of branches of clinical pathology.

The program for the 1954-55 season will be enriched by projection of motion pictures. As in the past, all active and inactive technicians residing in the two counties are invited, as well as all house officers of hospitals and related institutions in the area. As in former years, the meetings, which are held the second Monday of each month at 8:00 p.m., will be followed by a social hour with refreshments. The schedule follows:

10-11-54—Beebe Hospital, Lewes: Practical parasitology and mycology.

11- 8-54—Milford Memorial Hospital, Milford: Film — The Rh factor and blood testing procedures.

12-13-54—Kent General Hospital, Dover: Toxicology in the hospital laboratory.

1-10-55—Beebe Hospital, Lewes: Molar and normal solutions.

2-14-55—Milford Memorial Hospital, Milford: Film — Anemias.

3-14-55—Kent General Hospital, Dover: Laboratory tests in infertility studies.

4-11-55—Beebe Hospital, Lewes: Adrenal function tests.

5- 9-55—Milford Memorial Hospital, Milford: Films — Blood banking and Electrolytes.

6-13-55—Kent General Hospital, Dover: Sputum examinations.

Answers to Diction Quiz

1-c; 2-b; 3-a; 4-a; 5-a; 6-b; 7-c; 8-a; 9-a; 10-b; 11-b; 12-c.

Dr. Bird Resigns from Blue Cross-Blue Shield

Dr. W. Edwin Bird, for the past eight years the Medical Consultant of Group Hospital Service, Incorporated, has resigned from that post, effective January 15, 1955. This was done in order to permit Dr. Bird to devote more time to his other interests as Editor of the Delaware State Medical Journal, Executive Secretary of the Medical Society of Delaware, and special editorial work for a New York firm. Said Dr. Bird: "I found I was getting overloaded, and something had to go. Naturally the job to go would have to be the one that confined me the most as to time, and that was the most arduous physically. I regret exceedingly that it had to be the Blue Cross, for I regard Blue Cross somewhat as my own baby."

As far back as 1930, when the Blue Cross was only five years old, with only five or six Plans in operation, Dr. Bird sensed the importance and the possibilities of this new movement and got the Medical Society of Delaware to set up a Medical Economics Committee to deal with such problems. He was made Chairman of this Committee, and in 1935 secured the endorsement of the State Society and of the New Castle County Socity of the proposed Plan in Delaware. He was one of the founders of Blue Cross, which opened in 1935 and of the Blue Shield in 1943, serving as Secretary of the corporation and a member of the Board of Trustees till the end of 1952.

The management and Claims Department of G.H.S. tendered Dr. Bird a farewell luncheon on January 14th at the Hotel Rodney, on which occasion he was presented with a 20-year service button.

On February 1st the vacancy created by Dr. Bird's resignation was filled by the appointment to that post of Dr. Walter W. Moore, of Wilmington.

The value of the routine roentgenographic examination of the chests of all patients admitted to general hospitals has been recognized for almost 30 years, and its advantages over other case-finding methods have been pointed out repeatedly. Yet, until quite recently the major emphasis has been on the mass chest roentgenographic survey, such as those conducted in various cities throughout the country by the Public Health Service in conjunction with the local health organizations. George Jacobson, M.D., and Denis C. Adler, M.D., Am. Rev. Tuberc., June, 1954.

NEW MEMBERS SINCE JULY 15, 1954

The following physicians have become members of the Medical Society of Delaware since the printing of the Roster last summer. Cut these items out of **The Journal** and paste them in your copy of the Roster, under their appropriate County. Also, in your Roster, rule out the following names of deceased or transferred members: Murray, Henry D.; Neubauer, Richard A.; Potter, Caryl A., Jr.; Vaughan, Edward M.; Allen, Ira A. B.; Fooks, Carleton C. With these alterations your Roster will be complete and accurate to January 19, 1955.

Name	Address	Specialty	Tel.	School	Licen.	Joined
Allen, Olin S., II	Reading, Pa.			Temple, '52	1953	1954
Baganz, Herbert M.	1210 Delaware Ave.	I	5-3329	Penn, '47	1951	1954
Blase, William C.	1009 Delaware Ave.	I	4-9039	Hahn., '47	1948	1954
Hall, Wm. T.	2201 Washington St.	I	8-2660	Temple, '44	1954	1954
Hillyard, Raymond W.	1007 Delaware Ave.	NS*	4-8835	Penn., '46	1953	1954
McCarthy, James	1100 Madison St.		2-6144	Hahn., '48	1949	1954
Mekanik, Edwin A.	1100 N. Jackson St.	S	5-7187	Hahn., '46	1953	1954
McKusick, Marjorie J.	1302 Delaware Ave.	Pd*	6-9729	Harvard, '49	1953	1955
Sherman, Leo F.	94 E. Main St., Newark, Del.			M.C. Va., '50	1954	1954
Sisson, William H.	1104 N. Adams St.	P*	4-5432	Vermont, '45	1954	1954
Smith, Glen T.	Nemours Bldg.	In(I)*	4-5121	Chicago, '37	1954	1954
Van Dervort, Robert S.	Wilm. General Hosp.	An*	6-2551	Pitt., '46	1954	1954
Wuertz, Robert L.	1117 N. Franklin St.	I	8-5437	Temple, '48	1953	1954
Hays, James F.	Latex Corp., Dover, Del.	In(C)*	4761	Jeff., '23	1954	1954
Buoniconto, Pasquale A.	Dela. Colony, Stockley, Del.	Ph(P)*	Millsboro 2611	Naples, '35	1954	1954
Henning, Carl (Ret.)	Rehoboth, Del.	O		G. Wash., '05	1948	1955
McFadden, Earl B.	Selbyville, Del.		3616	Md., '51	1953	1955
Sills, David N., Jr.	Milford, Del.	S*	4053	Md., '46	1954	1955

BOOK REVIEW

UROLOGY. Volumes I, II, and III. Edited by Meredith Campbell, M.D., Emeritus Professor of Urology, New York University. With the collaboration of fifty-one contributing authorities. Pp. 2,356, with 1,148 illustrations. Price: $60.00 per set. Philadelphia: W. B. Saunders Company, 1954.

These three volumes comprise a systematic and comprehensive system of urology. Each volume is indexed for all three volume is clearly printed on the backs for easy selection. The contributors have been selected for their eminence in the particular phase of urology for which they are best known and wherein they have made particularly notable contributions. The list of names reads like a Who's Who of Urologists in the United States, plus one each from England, Canada, and Puerto Rico. In addition, there are chapters in the fields of Anatomy, Physiology, Zoology, Biophysics, Surgery, Pediatrics, Clinical Medicine, Anaesthesiology, Pathology and Gynecology as related to Urology by men of great eminence, authority and ability. The most important quality of all the writing is the lucidity of the text (and the excellence of the 1148 illustrations and figures) which, despite the variety of authorship, has been so edited and arranged that this reviewer was continuously impressed with the feeling of single authorship. This three volume Urology has transcended the danger of being a mere collection of assigned articles and reads truly as Campbell's Urology, at the same time however, always carrying the authority and conviction of the individual expert contributor.

A summary of such a monumental work is obviously impossible. Volume I covers Anatomy and Physiology, Principles of Diagnosis, Pathology of Urinary Obstruction, Embryology and Anomalies, Infections and Inflammations, Infertility in the Male, Urolothiasis and Foreign Bodies. Volume II includes Injuries, Tumors, Neuro-muscular disease, Urology in the Female, Urology in Childhood. Volume III completes the field with Endocrinology, Urologic Surgery, Radiotherapy of Tumors, Nephritis and Hypertension, and Adrenals.

The material is up-to-date, comprehensive, and extensive. Background material and comparative approaches are discussed and evaluated, and copious references supplied at the end of each chapter for substantiation as well as for the guidance of the student who desires to go to source material. The statistical data is all recent and the therapy is as up-to-date as furadantin, tetracycline and erythromycin, cortisone and isonyazid.

In conclusion, this reviewer would like to comment that he has found this Urology a much needed book for the Urologist, for medical libraries, and for any other person desiring complete reference in this field. I am sure that some deficiencies exist and that perfection is the last thing that Dr. Campbell would claim for his book. But as he writes in his preface, "a publisher's proposal to write a one-volume Textbook of Urology was the nidus of this Urology. I declined this proposition because today's progress and development in this branch of medicine and its collateral fields are so amazing, rapid and variant that it is now beyond the scope of any one person to present all phases of this subject adequately. To achieve recognized authority for Urology, as distinguished from mere compilation gleaned from others, outstanding collaborators were enlisted. In this corps are those nationally or internationally renowned for their intensive investigative work and unusually wide experience in the sphere of their respective topics. Many of these contributions are classic monographs."

The immediate value of the X-ray survey at hospitals for the mentally ill is obvious. The patients who have active tuberculosis are receiving specialized care both for their mental and for their physical illnesses. They are isolated and therefore the non-tuberculous patients are spared the insidious long-time mass exposure to a highly infectious disease which without the X-ray might go undetected. Elizabeth S. Kletzsch, NTA Bulletin, Feb., 1954.

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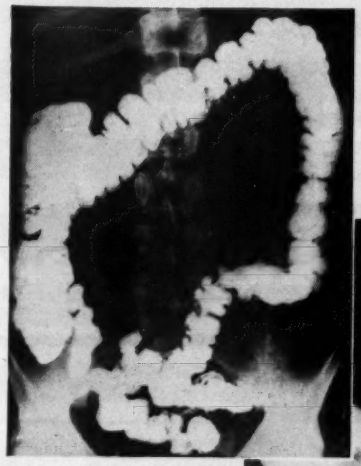

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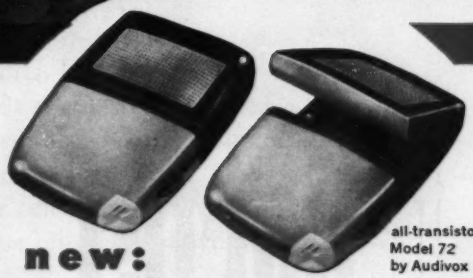

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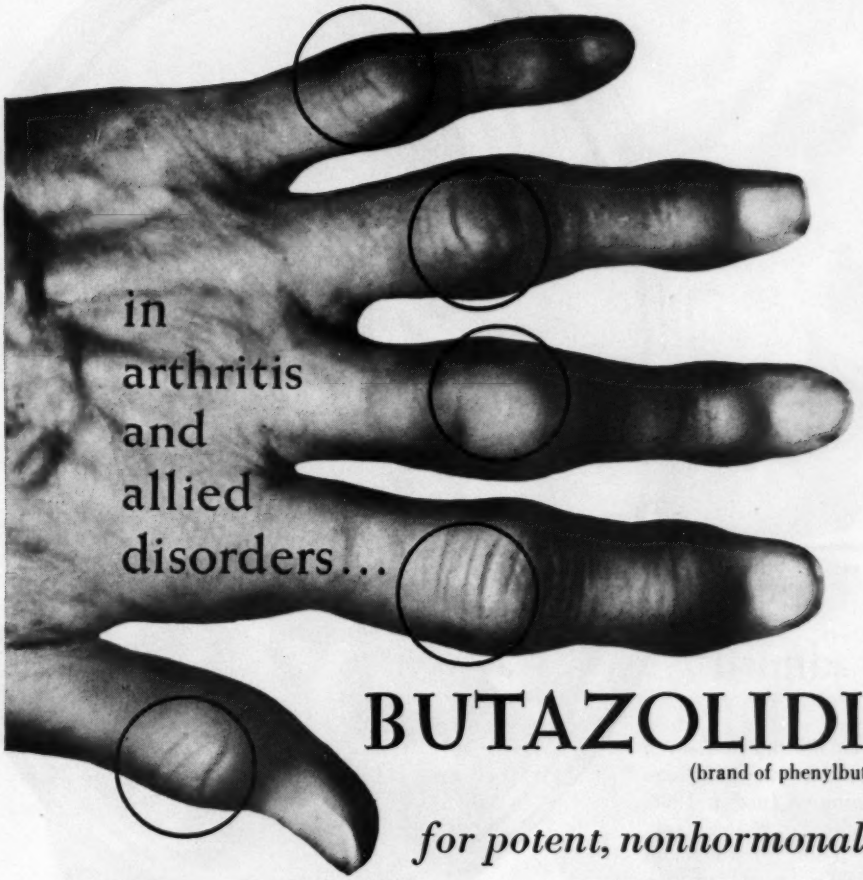

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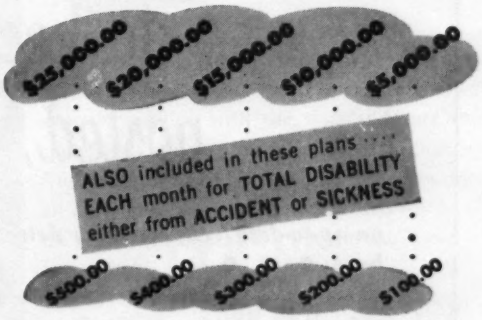

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Enjoy instant, plentiful hot water

For downright convenience, comfort and health of your family — you should have an ample, reliable supply of hot water! With an Automatic Gas Water Heater in your Home, you're sure of all the hot water you want, when you want it. For lightening h o u s e h o l d tasks, b a t h i n g, cleaning, dishw a s h i n g, laundering and many other uses. Besides, you save time and worry, for you're sure of constant water temperatures at low cost. Arrange for the installation of an Automatic Gas Water Heater in your home now. Ask your Plumber, or stop in to see us.

With an Automatic Gas
WATER HEATER

DELAWARE POWER & LIGHT CO.
"The Public Appreciates Service"

Borden's
REG U.S. PAT. OFF.
ICE CREAM
IF IT'S BORDEN'S IT'S GOT TO BE GOOD

Pure as sunlight

"Quality carries on"

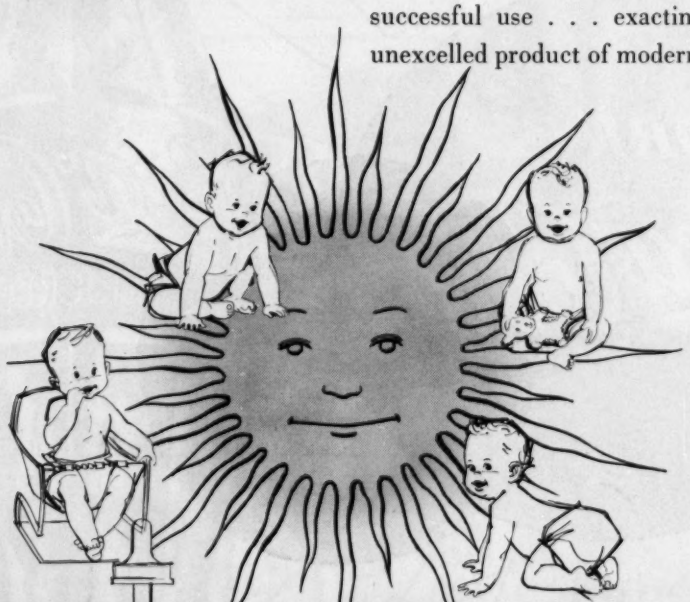
DRINK
Coca-Cola
REG. U.S. PAT. OFF.

DEPENDABLE PROTECTION COSTS SO LITTLE

No child need be denied protection against rickets and vitamin A and D deficiencies.

Mead's Oleum Percomorphum is a potent, effective source of vitamins A & D . . . that can be given at a cost of about a penny a day.

Specify Mead's Oleum Percomorphum for utmost dependability. It assures your pediatric patients a vitamin preparation with more than 20 years of successful use . . . exactingly assayed . . . an unexcelled product of modern processing.



MEAD'S OLEUM PERCOMORPHUM

economical, potent vitamin A & D drops

Dosage: 5 to 10 drops daily. Available in 10 cc. and in economical 50 cc. bottles.

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